



**GPM** Global  
Precipitation  
Measurement



# JAXA/Earth Observation Program and Water Management Services

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# Frameworks of promotion in Asia

- ❁ Sentinel-Asia Project ; APRSAF (Asia-Pacific Regional Space Agency Forum)
  - ❁ Flood monitoring...Flood WG
  - ❁ Capacity building for utilization of satellite image for disaster management
- ❁ IGOS Water Cycle Theme
  - ❁ Contribution to GEOSS
    - ❁ Capacity building in Asia
      - ❁ International Workshop on CAPACITY BUILDING IN ASIA "EARTH OBSERVATIONS IN THE SERVICE OF WATER MANAGEMENT" 26th -28th September 2006, Bangkok, Thailand
- ❁ GPM Project
  - ❁ Inviting Met/Hydro service and space organizations of Asian countries to GPM International Planning Workshop
- ❁ Others
  - ❁ Remote Sensing Training Course through JICA



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# “Sentinel-Asia” and its Flood WG

## Background / Philosophy / Framework

**APRSAF(Asia-Pacific Regional Space Agency Forum)**, established in 1993  
Enhance the development of space programs in the Asia-Pacific region and promote regional cooperation in the field of space technology and its applications.

**[Participation]** Space agencies, related governments, regional and international organizations, institutions responsible for applying space technology.

**[Organizers]** MEXT, JAXA and co-host organizations

### Disaster Management Support System in Asia-Pacific Region (DMSS)

APRSAF12, Oct 2005, approved the plan and to initiate the pilot project.

### **1<sup>st</sup> step:** Sentinel-Asia Project *Operations started in October 2006*

#### *Main Activities*

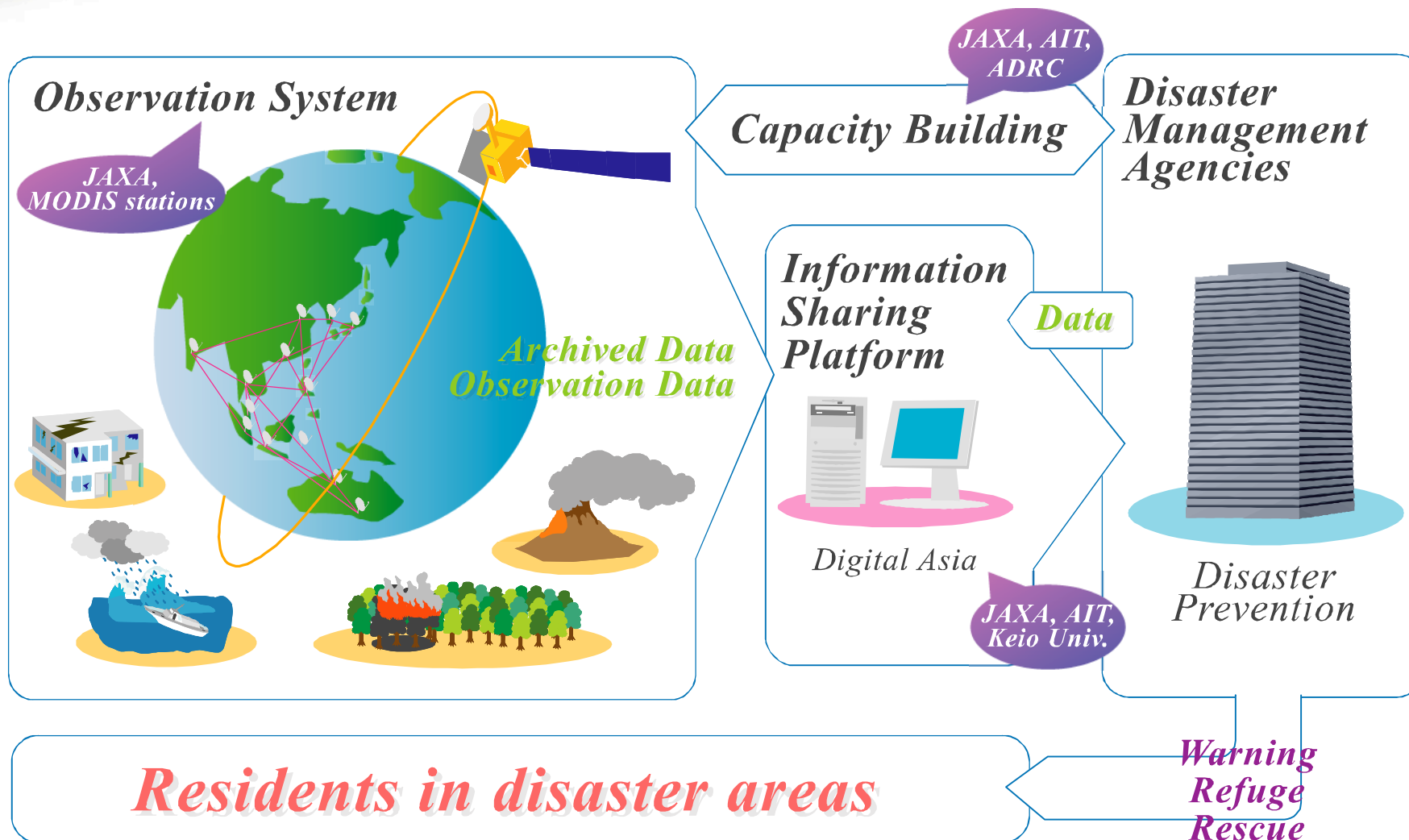
- **Emergency observation in case of major disasters by ALOS + ...**
- **ALOS accepts observation request from ADRC member countries and space organizations**
- **Wildfire monitoring by MODIS**
- **Flood monitoring...Flood WG**
- **Capacity building for utilization of satellite image for disaster management**

Satellite Information Distribution Network for Disaster Management of Asia-Pacific”





# Overall Flow of Sentinel-Asia







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# Capacity Building project



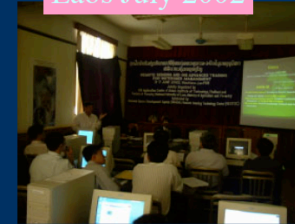
## JAXA'S 2005 Capacity Building Activities for Disaster Management

*In 2005, JAXA has been carrying out the following 8 mini-projects, which are the object-oriented training programs, with 6 countries especially focusing on Disaster Management:*

- (1) **Bangladesh:** Space Research and RS Organization (SPARRSO)  
"Flood Mitigation"
- (2) **Cambodia:** Department of Land Management  
"Land Use Planning Resource Management"
- (3) **Nepal:** Survey Department  
"Urban Planning for Earthquake Disaster Management"  
Department of Geography  
"Flood"
- (4) **Philippines:** National Mapping and Resource Information Authority (NAMRIA)  
"Landslide, Flood"
- (5) **Sri Lanka:** Central Engineering Consultancy Bureau (CECB)  
"Landslide"
- (6) **Vietnam:** Space Technology Application Center (STAC), Institute of Physics  
"Mangrove Forest Management for Flood Mitigation"  
Department of Dike Management  
"Landslide"

### Training at Local Institutes

Laos July 2002



Vietnam July 2003



Bangladesh August 2003



### AIT training in the field





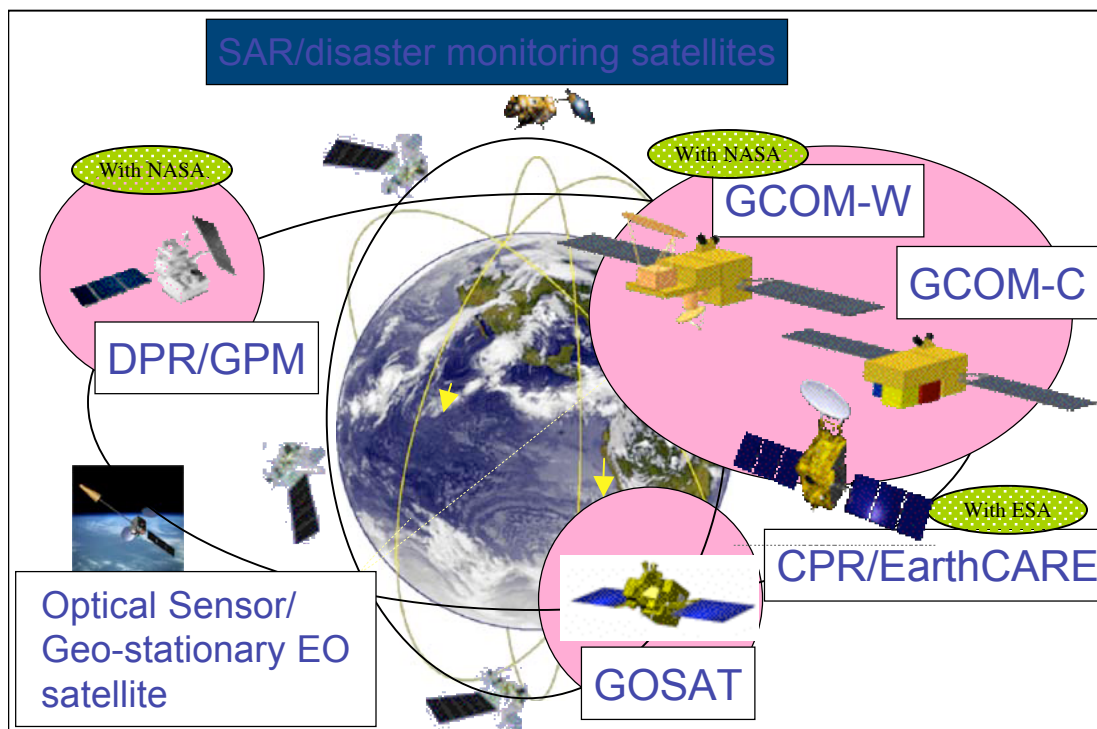
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# JAXA Earth Observation Program for GEOSS

To develop and operate an Earth Observation System for GEOSS

**A plan of advanced low Earth orbit satellites**



Sea surface wind vector	AMSR F/O, Scatterometer (GCOM-W)
SST_	AMSR F/O (GCOM-W)
Cloud structure	Cloud Profiling Radar (EarthCARE)
Aerosol	GLI F/O (GCOM-C)
CO <sub>2</sub> concentration	Greenhouse Gas Observation Sensor (GOSAT)
<b>Precipitation</b>	<b>Dual-frequency Precipitation Radar (GPM)</b>
Disaster monitoring	SAR(disaster monitoring satellites), Optical Sensor(Geo-stationary EO satellite)



# Capacity Building Workshop in Asia

- ❁ International Workshop on CAPACITY BUILDING IN ASIA "EARTH OBSERVATIONS IN THE SERVICE OF WATER MANAGEMENT" 26th -28th September 2006, Bangkok, Thailand
- ❁ to address the **uses and applications of Earth observations for sustainable water management.**
- ❁ The workshop aims to:
  - ❁ exchange information on **best practices for applications of Earth observations for water resource management** in Asia and other regions.
  - ❁ exchange information on **available data and tools** for applications of Earth observations for water resource management in Asia.
  - ❁ consolidate a statement of **regional requirements based upon existing needs** for Earth observations and capacity building activities for water resource management in Asia.
  - ❁ discuss and propose a **next step of the regional capacity building projects** for applications of Earth observations for water resource management in Asia.

**Workshop website: <http://www.a-a-r-s.org/ws-eowm/>**





# **The International Workshop on Capacity Building in Asia**

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## **on the theme 'Earth Observations in the Service of Water Management'**





- ❁ was held in Bangkok, Thailand from 26th to 28th September 2006.
- ❁ co-hosted by Integrated Global Water Cycle Observation (IGWCO), Group on Earth Observations (GEO), Japanese Aerospace Exploration Agency (JAXA), University of Tokyo (UT), Asian Institute of Technology (AIT), United Nations University (UNU), United Nations Social Commission for Asia and the Pacific (UN-ESCAP), World Meteorological Organization (WMO), World Climate Research Programme (WCRP) and the International Centre for Water Hazard and Risk Management (ICHARM). Sponsors of the Workshop were JAXA, UT, and WMO.
- ❁ was attended by 121 participants from 22 countries. In order to assure high-quality, interactive participation, about half of the attendance at the workshop was by invitation and included policy makers, Earth observation providers, resource managers and top academia mainly from 55 state sector organisations.
- ❁ Proceedings of workshop, which had its occurrence over three days was well split into 5 main Plenary Sessions excluding the Opening Session. Sessions 1, 2, and 3 which held during Day 1 were devoted for Policy makers. Target groups for Session 4 and Session 5 which held during Day 2 and Day 3 respectively were Earth Observation Providers and Water Resource Mangers.
  - ❁ Flood Working group, Drought Working group, Water quality Working group

# Working Group Report on Flooding

Co-chairs: K Fukami, ICHARM, Japan and T P Kafle, AIT, Bangkok

Rapporteur: H. Kai, JAXA, Japan

## **RECOMMENDATIONS AND ACTION PLAN**

-  1) High resolution satellite data are important for flood damage reduction and risk management. These data can be utilized for preparing existing infrastructures inventories, especially, in high risk areas. Space agencies are requested to make such basic data easily accessible and available on a basin scale.
-  2) Space agencies are requested to make available data for disaster management purposes especially rainfall and flood inundation in real time.
-  3) The realization GPM project is crucial for the implementation of flood forecasting and warning system in ungauged or poorly-gauged river basins, including Tran boundary ones.
-  4) More microwave imaging sensors are required for cloud-free flood disaster monitoring in a timely manner. Besides, their processing and application systems for flood analyses are also required.

- ❁ 5) Capacity Development on data acquisition, information extraction and end user product generation for flood analysis and risk reduction is urgently required in almost all of the developing countries in Asia.
- ❁ 6) Considering the disparity in existing capabilities among different countries as well as their varied needs, it is recommended to work out capacity development programs based on prior need assessment.
- ❁ 7) Incorporating the above mentioned requirements, it is proposed to develop some demonstration projects in conjunction with the framework of AWCI, Sentinel Asia, etc. for the evaluation of applicability of earth observations in flood risk reduction.
- ❁ 8) In order to implement the demonstration projects, some volunteer members would draft a proposal as a GEO demonstration project starting from the fiscal year 2008. The preliminary draft would be reviewed by the volunteer members and be proposed at the next Flood WG, which is planned to be held, hopefully, in the 2nd Asian Water Cycle Symposium at Tokyo in January 2007.





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# backup



# Water-related hazards/disasters may occur anywhere in the world



Recent disasters, e.g.;



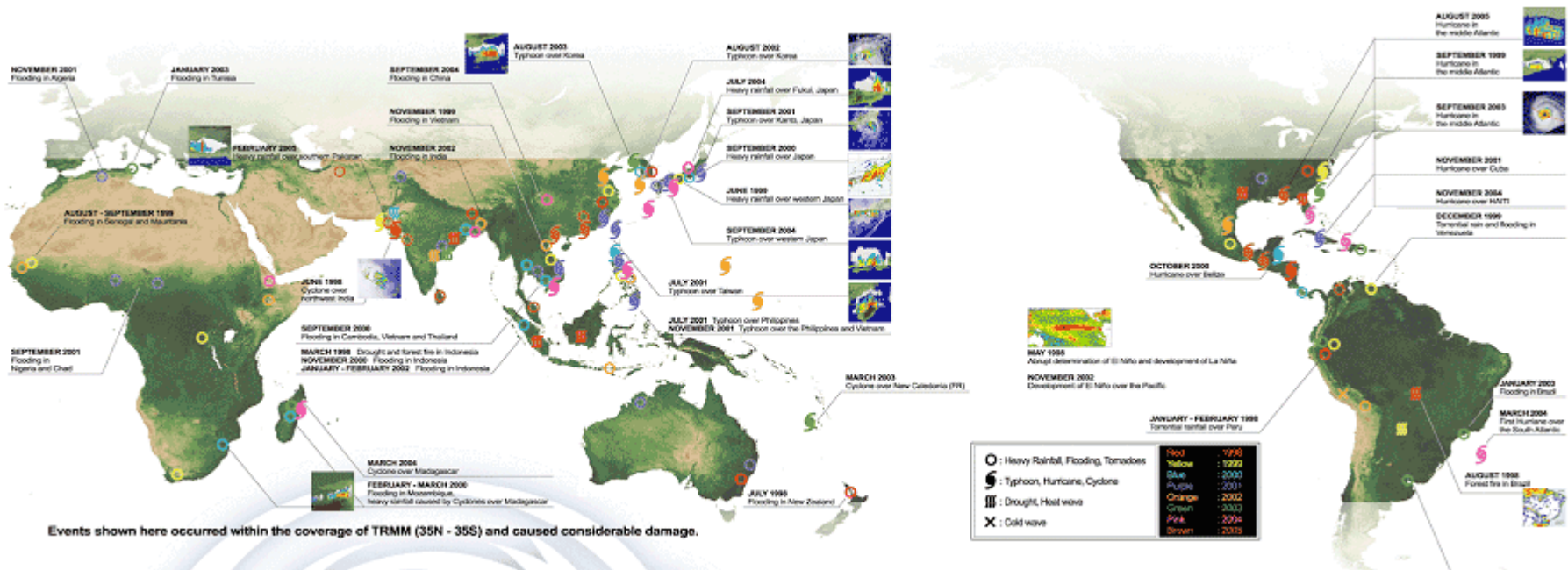
Flash floods in Northern Thailand (May 2006);



Landslide in Leyte Island, Philippines (Feb. 2006);



and so on ...



**Major meteorological disasters within the coverage of TRMM (35N-35S) during 1998-2005**



# Framework of Sentinel-Asia Project

*Best-efforts, voluntary initiative by participating organizations*

## Space Community

**APRSAF\***

**Content**

Satellite Image

Promotion of Utilization

Capacity Building

\* Asian-Pacific Regional  
Space Agency Forum

## International Community

UN / ESCAP  
ASEAN

UN / OOSA  
AIT

International Cooperation

# Sentinel-Asia

## Joint Project Team (JPT)

Join Project Team, consists of total 27 organizations including 23 agencies from 14 countries and 4 international organizations as of Feb. 2006.

## Digital Earth / Web-GIS Community

**Digital Asia**

Information Sharing Platform

Web-GIS  
Data / Meta Data Management

**Content**

Digital Map  
Social / Economic Data  
Satellite Image

## Disaster Reduction Community

**ADRC\*\***  
Member Countries

**Content**

Disaster Information

Utilization (User)





## (Global Earth Observation System of Systems)

### GEOSS

#### Earth System Models

- Oceans
- Cryosphere
- Land
- Atmosphere
- Solid Earth
- Biosphere

#### Prediction and Analysis

High Performance Computing;  
Communication  
Visualization

#### Other Data Sources

Socio-economic data

Assimilation

#### Earth Observation Systems

- In Situ
- Airborne
- Space-based

Standards & Interoperability  
Observations

#### Decision Support

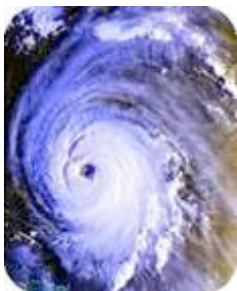
- Assessment
- Decision Support Systems

Policy  
Decisions

Management  
Decisions

Ongoing feedback to optimize value, reduce gaps, and account for human activity

#### Disasters



#### Biodiversity



### 9 Societal Benefit Areas



Health



Energy



Climate



Water



Weather



Ecosystem



Agriculture